

REMARKS

The present remarks are in response to the Office Action dated March 16, 2006, in which the Examiner rejected claims 1-4, 6-20, 24-26. Applicants respectfully request reexamination and reconsideration under the provisions of 37 C.F.R. § 1.116(a). In particular, Applicants respectfully responds to the Examiner's Detailed Action and requests the Examiner place all claims detailed in the application in a state of allowance.

A. Prior Art Rejection under 35 U.S.C. §102(b)

The Examiner rejected claims 1-3 under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2004/0036076 to Arita (hereinafter referred to as "Arita"). In particular, the Examiner states, referring to FIGs. 1a-4g of Arita, that this prior art reference teaches a method of stripping an integrated circuit (IC) structure having a photoresist material, an organosilicate glass (OSG) material, and a via etched into said IC structure.

The Examiner states that Arita teaches the steps of feeding a nitrous oxide (N₂O) gas into a reactor; generating a plasma in the reactor, stripping the photoresist; generating an organic plug that occupies said via, and stripping said organic plug with said N₂O gas; and generating a high selectivity between the photoresist and the OSG.

Applicants submit, however, that Arita does not describe or suggest the step of feeding a nitrous oxide gas into a reactor. For example, in Applicants' Specification, a nitrous oxide (N₂O) gas is used to strip or remove the organic

photoresist. Arita merely states that O₂, N₂O or H₂O plasma ashing may be performed supplementarily when the MSQ-based light absorbing sacrificial film 10 instead of the organic photoresist is removed (see Arita, col. 4, paragraph 40).

Additionally, Arita is entirely silent on the steps of generating a plasma in the reactor; stripping said photoresist, generating an organic plug that occupies said via, and stripping said organic plug with said N₂O gas. In fact, Arita does not make mention of any of the detailed steps of the organic stripping solution.

Furthermore, applicants' claim 1 recites a step of generating a high selectivity between the photoresist and the OSG. However, in the embodiments described in Arita, the layers, such as a light absorbing sacrificial film 10, a first hard mask 6, a interconnect interlayer film 5, can be etched selectively during the etching process (see Arita, paragraphs 48, 60, 69, and 77). Thus, Arita does not describe nor suggest the step of generating a high selectivity between the photoresist and the OSG.

For instance, the Examiner further rejected claims 2, 7, and 18 on the basis that Arita discloses that the photoresist is an organic photoresist. However, Arita nowhere describes that the photoresist is either organic or inorganic. In fact, Arita merely mentions steps of how to form the photoresist (see Arita, col. 4, paragraph 39), but is wholly silent on whether the photoresist is organic or inorganic from the described steps.

Therefore, Applicants submit Arita does not anticipate Applicants' claim 1.

B. Prior Art Rejections under 35 U.S.C. §103

The Examiner has further rejected claims 4, 6-20, 24-26 as being unpatentable over Arita as applied to claims 1-3 above, in view of Gardner et al., U.S. Patent No. 5,970,375 (hereinafter referred to as "Gardner") and in further view of Ho et al., U.S. Patent Publication No. 2005/0014362 (hereinafter referred to as "Ho") under 35 U.S.C. §103. We note that although the office action mentions U.S. 5,970,375 issued to Chen, this patent is in fact issued to Gardner et al.

Applicants respectfully disagree with the Examiner's arguments.

As stated in §2143 of the MPEP:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure. Section 2143, MPEP Rev. 2.0, May 2004, pg. 2100-129.

Applicants submit that claims 4, 7-20, 24-26 includes, *inter alia*, the limitation of claims 1, 6 and 20, namely for claim 1, the limitations already discussed above, and for claims 7-19, i.e., feeding a nitrous oxide (N₂O) gas into a reactor; generating a plasma in the reactor; stripping the photoresist with the plasma; generating a high selectivity between the first photoresist layer and the second intermediate layer; stripping the second intermediate layer with the plasma; and generating a high selectivity between the first photoresist layer and the third OSG layer. Further, the

limitations of claim 20, 24-26 include, *inter alia*, performing a trench first etch with an IC structure including a first photoresist layer, a second hardmask layer, and a third organosilicate glass (OSG) layer, having the steps of etching a trench into said second hardmask layer; stripping the first photoresist layer with a nitrous oxide (N₂O) gas; applying another first photoresist layer for performing a via etch; etching a via into the second hardmask layer, and the third OSG layer; stripping the other first photoresist layer with the N₂O gas; generating an organic plug within the via, and using the N₂O gas to strip the organic plug. As stated above, to establish a *prima facie* obviousness rejection, the Examiner's prior art must teach or suggest all of the claim limitations.

In the present office action, the Examiner reiterates the objections based on Arita's FIGs. 1a-4g. This time, regarding claim 4, for example, the Examiner states that although Arita does not teach the features of claim 4, Gardner provides that stripping the photoresist is performed in the same reactor chamber for etching the OSG material. However, Gardner does not describe nor suggest this feature. In fact, referring to the removal process, Gardner states that selective portions of capping dielectric 38, local interconnect 36, and interlevel dielectric 35 are etched separately (see Gardner, col. 5, lines 63-67), and chemical-mechanical polishing may then be used to remove the conductive material from the surface of capping dielectric 38 (see Gardner, col. 6, lines 14-16). Thus, Gardner does not disclose nor suggest stripping the photoresist. In addition, in Gardner, the aim of removing the material in the same reactor chamber is not for etching the OSG material but for the formation of the vias or polishing the surface of capping dielectric. Consequently, one skilled in the art would not be motivated to combine Gardner with the teachings of Arita to

arrive at Applicants' claim 4 reciting the step of stripping the photoresist being performed in the same reactor chamber for etching the OSG material.

Regarding claim 6, which recites some steps also recited in claim 1, Examiner states that Arita teaches a method of stripping an integrated circuit structure having a photoresist material, second intermediate layer, an OSG material, and a via etched into said IC structure. Additionally, the Examiner states that Arita teaches a method comprising feeding a nitrous oxide (N_2O) gas into a reactor; generating a plasma in the reactor; stripping the photoresist; generating a high selectivity between the first photoresist layer and the second intermediate layer; generating an organic plug that occupies the via, and stripping the organic plug with the N_2O gas; and generating a high selectivity between the photoresist and the OSG. However, as analyzed above, Arita is again silent as to these latter steps.

Regarding claims 7 and 18, which recite the same feature as that of claim 2, the Examiner states that Arita discloses that the photoresist is an organic photoresist. Again, as analyzed above, Arita fails to describe that the photoresist is either organic or inorganic.

Concerning claim 14, the Examiner states that Arita describes the method of etching a via into the second cap layer and the third OSG layer, stripping the photoresist layer, generating an organic plug within the via; and stripping the organic plug with the N_2O gas. However, Arita fails to teach the steps of generating an organic plug within the via and stripping the organic plug with the N_2O gas.

Moreover, the Examiner acknowledges that although Arita does not teach stripping the photoresist with N_2O gas, nor forming the organic plug within the via occupies part of the third OSG layer, the Examiner cites Gardner as teaching

stripping the photoresist with N_2O gas, and Ho as teaching forming the organic plug within the via occupies part of the third OSG layer.

Nevertheless, Gardner does not describe nor suggest this. Gardner discloses a method of forming a high density multi-level metallization scheme employing localized interconnect. In Gardner, referring to the removal process, different types of chemicals, i.e., etchants, are required to remove different materials, such as selective portions of the capping dielectric 38, local interconnect 36, and interlevel dielectric 35 (see Gardner, col. 5, lines 60-67). Additionally, in Gardner, chemical-mechanical polishing may be used to remove the conductive material from the surface of the capping dielectric 38 (see Gardner, col 6, lines 14-16). Therefore, Gardner nowhere mentions anything about stripping the photoresist with N_2O gas.

Furthermore, Ho describes forming the organic plug within the via as an anti-reflective layer but does not describe forming the organic plug within the via (see Ho, col. 3, paragraphs 41, 46). In short, one skilled in the art would not have been motivated to combine the teachings of Gardner and Ho to arrive at Applicants' recited steps of stripping the organic plug with the N_2O gas and generating an organic plug within the via.

Moreover, Applicant notes that the foregoing obviousness rejections based on Arita and Gardner are impermissible hindsight reconstruction and also lack the required motivation or suggestion from the prior art to combine the references. Applicants point out that the present invention is of a nature that may be readily understood – once it is examined as disclosed in the application and expressed in the claims. As such, the tendency to use the elements of the claimed invention as a template to conclude that the invention is obvious is improper, i.e., using applicant's

claim as a template to reconstruct the invention by picking and choosing isolated disclosures from the prior art. This is impermissible under the law.

The Federal Circuit has warned that “the very ease with which the invention can be understood may prompt one to fall victim to the insidious effect of a hindsight syndrome where that which only the invention taught is used against its teacher.” *Richard Ruiz and Foundation Anchoring Systems, Inc. v. A.B. Chance Co.*, 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004). The Office Action relies upon a variety of features of a variety of references, which could only be done when the claims of the present application are, impermissibly, used as a guide:

It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). This court has previously stated that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” [*In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992), quoting *In re Fine*, 837 F.2d at 1075, 5 USPQ2d at 1600].

The present rejection fits the court’s description of what may not be done under §103. The Examiner has merely listed certain components of applicant’s invention and then located isolated disclosures of those components. The law requires more than that.

The examiners must show where the prior art provides a motivation to combine the references they have combined in the obviousness rejection. Absent a motivation to combine, obviousness has not been demonstrated. As the Federal

Circuit stated in *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 934, 15 USPQ2d 1321, 1323 (Fed. Cir. 1990):

It is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor. (emphasis added)

Not only is such a requirement found in the case law which is binding upon the office, but the MPEE §2143 cited above also sets forth a similar requirement. The Office Action has not identified any suggestion from the prior art to modify the references. There is no reasonable expectation of success. To the contrary, since the teachings of the prior art are generally contradictory, as pointed out above, one of ordinary skill would be disinclined to combine the references and would have no reasonable expectation of success. Finally, as also pointed out above, there are certain claim elements which are simply not found in the prior art. For at least these reasons, Applicants respectfully request withdrawal of the rejections based upon obviousness.

Therefore, Applicants submit that all of the claims are allowable over the combination of the cited reference as none of the above references, alone or in combination, suggest or describe the aforementioned features recited in Applicants' claims. Specifically, the limitations of independent claims 1, 6, 14, and 20 are not taught or suggested by Arita, as applied to claims 1-3 above, in view of Gardner and/or Ho. Since independent claims 1, 6, 14 and 20 overcome the 35 USC §103 rejection, Applicant respectfully requests that each of claims 2-4, 7-13, 15-19, 24-26 overcome the obviousness rejection by way of their dependencies.

C. Conclusion

In view of the foregoing remarks, all of the claims are now in condition for allowance, which action is requested, and withdrawal of the finality of the rejection of the present Office Action and allowance of claims 1-4, 6-20, 24-26 are respectfully requested.

Respectfully Submitted;

Dated: 6/15/06



Michael A. Kerr
Patent Attorney
Reg. No. 42,722

Michael A. Kerr
VIRTUAL LEGAL, P.C.
3594 Executive Pointe Way
Carson City, NV 89706

Tel: (775) 841-3388
Fax: (858) 841-3389